Economics and Sociology
Occasional Paper No. 1463

# Costs of Intermediation in Rural Banking in Bangladesh

by

Aruna Srinivasan and Richard L. Meyer



May 1988

Agricultural Finance Program
Department of Agricultural Economics
and Rural Sociology
The Ohio State University
2120 Fyffe Road
Columbus, OH 43210

ACKNOWLEDGEMENTS

We wish to acknowledge with great appreciation the assistance of several persons and institutions that helped make possible the research reported in this paper. The USAID Mission in Dhaka provided much of the financial and logistical support through its Rural Finance Project. The Bangladesh Bank, especially the Agricultural Credit Department and Kamal Uddin Ahmed, the head offices of the participating banks, and the individual bank branches provided indispensable assistance in accessing the data used in the analysis. Zia Ahmed and his colleagues helped assemble the data from the head offices, and the R.R. Nathan team was exceptionally cooperative in providing logistical support and a critical review of the research design. Special thanks must go to Forrest E. Cookson, Jr. and Arthur J. O'Donnell for their important contributions. Finally, our colleague, Carlos E. Cuevas, provided significant methodological contributions. The views expressed in this paper, however, are our own and may not necessarily be shared by any of these persons or institutions.

In addition to these characteristics of rural areas of Bangladesh which contribute to high intermediation costs, policies such as reserve requirements, interest rate controls, and credit allocation that are designed to achieve certain economic objectives can also increase intermediation costs. Rediscounting is commonly used to subsidize rural credit and partly to offset the higher costs resulting from other policy instruments.

Estimation of the cost function is expected to shed light on the size and product mix of bank branches, an important issue in rural banking in Bangladesh. The cost- or supply-side benefits result from spreading fixed costs over an expanded output scale as well as product mix and reuse of information. Economies of scale and scope, however, are only one determinant of the size and structure of banking. In a small, densely-populated country as Bangladesh, risk considerations, market size, customer cost economies, and regulatory restrictions are equally important in determining branch size and location. On the one hand, scale economies may dictate further expansion of bank branches while, on the other hand, limited market size or location in a remote area may suggest that the branch is already of optimal size. Moreover, banks may jointly produce different outputs because of joint demand on the part of users, even if such production has no cost advantages for the bank or even if it has some disadvantages. This study captures the cost- or supply-side benefits from banking, but neglects the revenue- or demand-side benefits. Thus the total economies from joint production may be understated.

Previous studies of bank costs and viability have focused on the nonfinancial costs incurred by financial institutions. The latter approach, termed the "production approach" is appropriate for answering questions regarding the operational efficiency of banks. However, it has severe limitations in evaluating the viability of banks, since interest expenses are ignored in the estimation of the cost function. As a result, cost properties such as economies of scale and scope may be biased.

This paper proposes to use an alternative approach, the "intermediation approach", to examine the economic viability of a sample of rural bank branches in Bangladesh. Financial as well as nonfinancial costs incurred by banks are considered and the resulting cost characteristics are compared with those obtained from the traditional approach. The intermediation approach would adjust for any biases in scale and scope economy estimates due to differences in the size and mix of sources of funds across banks. The targeted funds disbursed under the special agricultural credit programs have dictated the patterns of sources and uses of funds for rural bank branches, especially during the past decade. These programs frequently exceed the resources that the banks generate via deposit mobilization and, therefore, require central bank refinance to support the programs. Furthermore, there is reason to believe that the loan repayment situation is bad, and getting worse. The deterioration in loan quality has exacerbated the liquidity problem and considerably reduced the flexibility with which financial intermediaries operate.

This paper begins with a brief discussion of key regulatory policies influencing rural banking in Bangladesh. The second section describes the model, definition of variables, and data used in the study. The third section presents some empirical results for intermediation costs and the fourth section summarizes the impact of the loan recovery problem on rural banking. The final section identifies some policy issues which arise from this research.

# Costs of Intermediation in Rural Banking in Bangladesh†

by

Aruna Srinivasan and Richard L. Meyer
Federal Reserve Bank of Atlanta and Ohio State University

## INTRODUCTION

The movement during the past decade, towards development of banking systems in the rural areas of Bangladesh has raised questions concerning the long-run viability of these institutions. The issue of viability of rural bank branches is complicated to analyze. Most discussions of viability in banking in Bangladesh center around meeting national objectives. At the national or policy making level, banks have been perceived as playing a role in furthering social objectives. Much emphasis has been placed in Bangladesh on the targeted lending programs of the rural bank branches as an induced use of resources to the benefit of the nation. An implicit objective has been to improve access to financial services in the rural areas. There are important trade-offs involved in operating a network of small, high-cost rural bank branches on the one hand, and reductions in customer transaction costs on the other. While the social benefits of the system have been emphasized, there is hardly any information pertaining to the costs and efficiency of the banking network.

This paper presents an estimate of the costs involved in rural banking in Bangladesh. Two alternative approaches are used to estimate costs: the production and intermediation approaches, which focus on operating efficiency and economic viability, respectively. This study deals with a number of issues relating to bank viability: Are the margins authorized for financial institutions sufficient to cover costs? Are the level of subsidies required to support institutions too large to be sustained by the government? Are there economies of scale in financial intermediation? Are loan loss reserves and interest margins adequate to cover projected loan losses? What is the impact of the poor loan recovery situation on the future viability of bank branches? An important objective for the financial sector should be a steady decline in intermediation costs so interest rates charged to borrowers are decreased and returns to savers are increased.

Several factors contribute to high financial intermediation costs in rural areas of Bangladesh. Rural infrastructure is poor so transportation and communication costs are high for financial institutions, for depositors, and for borrowers. Often, supporting systems and institutions are weak or nonexistent so information costs are high when lenders seek to determine land ownership, verify financial statements, ascertain credit worthiness, etc. Lending risks are also high because agricultural price policies, input supplies and marketing systems are underdeveloped for farmer borrowers. Deposit and loan sizes are frequently small so it is difficult to achieve the productivity of large account volumes per bank officer.

---

† The views expressed here do not necessarily reflect those of the Federal Reserve Bank of Atlanta or of the Federal Reserve System.

## RURAL BANKING IN BANGLADESH

The rural financial system in Bangladesh is dominated by the four nationalized commercial banks (NCBs) – Agrani, Janata, Rupali, Sonali – and the agricultural development bank, Bangladesh Krishi Bank (BKB). The NCBs are active both in lending and deposit mobilization, and have branches throughout the country. BKB, on the other hand, specializes in agricultural lending (although it does accept deposits), and is confined to the rural areas. Sonali Bank is the largest of the NCBs. In addition to its normal banking functions, it also provides treasury and banking services for the government and for public enterprises. As of June 1986, the NCBs controlled 63 percent of the gross assets in the monetary system. Furthermore, they mobilized an average of 80 percent of total deposits and provided 64 percent of total advances.

### Branching Policies

Among the several policies that have been used to shape the direction of the financial policies and control its activities, the branching policies of the Bangladesh Bank (the central bank) probably have the greatest influence on the rural operations of the NCBs and BKB. From 1977 until 1981, a "two-for-one" branching policy was in effect which required commercial banks to open two new rural branches for each new urban branch licensed. As a result, the number of rural bank branches increased nearly three-fold from 1977 until 1982. It has been argued that the rural branch expansion was intended to serve as a conduit for the allocation of agricultural credit to target groups. The policy may also have had the effect of reducing customer-incurred transaction costs in the rural areas and facilitated deposit mobilization (Meyer, Khalily and Hushak). The average population per bank branch declined from 39,961 inhabitants per branch in 1977 to 19,927 inhabitants per branch in 1987 (Ahmed). Deposit potential and level of banking competition appear to have been important factors in determining the licensing of specific branches.

However, the economic viability of these branches is open to question. In a branch banking system, it is possible that a rural branch, although uneconomical in its own operations, becomes profitable to the bank because of income earned from a more lucrative urban branch under the two-for-one policy. If this is true, it is possible that the demand for rural branches will fall once the choicest urban locations are exhausted. The slowdown in expansion of rural branches after the termination of the "two-for-one" policy in 1981 suggests that this may have occurred. The withdrawal of the two recently denationalized banks from rural areas and the transfer of some NCB rural branches to BKB in recent years may have represented an attempt by banks to rid themselves of the unprofitable operations that emerged because of this policy.

### Interest Rate Policy

Deposit rate ceilings have remained in effect since nationalization and have undergone major changes only three times (1974, 1976, and 1980).[1] Although the deposit rate has been slightly higher in rural branches than urban branches, much of the time the weighted average deposit rate has been negative in real terms. There were two major changes (1980 and 1983) in interest rate ceilings on loans and advances. The

---

[1] See table 1 in Meyer, Khalily and Hushak.

revision in 1980 set the lowest ceiling at 12 percent (on agricultural advances) and the highest at 15.5 percent (on general advances). The other major change in 1983 added a 4 percent service charge to agricultural lending. Currently, the rate on general lending is around 20 percent. Thus the interest rate authorized for rural loans has often been set lower than the rate authorized for loans to other sectors. With higher deposit rates and lower loan rates, the spread between deposit and lending rates is generally less favorable for rural than urban branches.

There are two implications of this interest rate structure. First, it is a disincentive for branches to aggressively mobilize rural deposits for rural lending. Second, if this rate structure does not cover operating costs, banks must subsidize rural operations with more profitable urban operations.

Refinance Policy

Lending rate policies are closely related to the refinance policies of the Bangladesh Bank. The stated objectives of refinance have been to (i) subsidize losses of public enterprises, (ii) provide resources to specialized institutions, (iii) accommodate seasonal fluctuations in demand for credit, and (iv) subsidize losses incurred by NCBs in lending to priority sectors (World Bank). The rural banking system has been the main beneficiary of this policy. Perhaps this policy was intended to offset the disincentives of higher deposit rates on rural deposits and lower lending rates on rural loans. For instance, during the early 1980s, rural credit could be refinanced up to a maximum of 50 percent of loans made (100 percent for BKB) at an interest rate of 6 percent with a maximum lending rate of 12 percent. At the same time, the weighted average bank interest rate paid on all deposits was 7 to 7.5 percent. Thus it was logical for the banks to mobilize rural deposits for urban lending and use refinance funds rather than deposits for rural lending. A variable rate policy for refinancing agricultural loans was adopted in 1983. The refinance rate now ranges from 7.5–10.5 percent and the cost of refinance is higher for the NCBs than for BKB. As will be shown later, the use of the intermediation approach to measuring bank costs and output is expected to capture differences in sources of funds across bank branches.

Table 1 shows the trends in sources of funds going into agricultural credit during 1975 to 1987. Use of the refinancing facility of the Bangladesh Bank increased rapidly from 1977 with the introduction of the Tk 100 crore Special Agricultural Credit Program. Net refinance as a percentage of total disbursement peaked at 42 percent in 1983. It has been argued that usage of refinance entitlements by banks is largely a function of credit ceilings, interest rates, net return on investments, and liquidity constraints of financial institutions (Virmani). As of June 1985, rural credit accounted for 72 percent of the total refinance outstanding with the Bangladesh Bank. There was considerable variation in refinance use over time, but Sonali and BKB accounted for over 80 percent of the total refinance outstanding on agricultural credit with the Bangladesh Bank in 1986.

Loan Targeting

Rediscounting is closely related to the loan targeting policies of the Bangladesh Bank. The central bank, at one point in time, operated as many as 60 specialized credit programs in the rural sector. These programs are crop-specific (e.g. bananas or jute), activity-specific (e.g. irrigation projects), or client-specific (e.g. women). To some

extent, this plethora of programs reflects the particular concerns or priorities of the donor agencies which finance them.

Not all programs are offered through all bank branches; as a result, some borrowers must apply for financing from more than one bank to address their full credit needs. This lack of one-stop shopping for banking services is time consuming for borrowers and compounds the problems of the banks in trying to ascertain a borrower's current indebtedness. Finally, from an efficiency perspective, both borrowers and lenders alike are burdened with additional paperwork. All bank branches are required to submit reports on loan disbursements and recoveries by target group and/or loan purpose to the head offices and the Bangladesh Bank. This reporting system can impose large costs on banks. The apparently "cheap" funds available from international sources have turned out to be expensive for financial institutions to administer in several other countries. This may also turn out to be the case in Bangladesh.

## MODEL AND METHODS

The model and methods used in this paper generally follow the approach described in Cuevas. Basically the procedure used was to estimate a translog cost function for a sample of rural bank branches. Costs are assumed to be dependent on output levels and input prices. The general form of the translog can be written as follows,

$$\ln C = \alpha_0 + \sum_{i=1}^{m} \alpha_i \ln q_i + \sum_{j=1}^{n} \beta_j \ln p_j + \tfrac{1}{2} \sum_{i=1}^{m} \sum_{k=1}^{m} \gamma_{ik} \ln q_i \ln q_k$$

$$+ \tfrac{1}{2} \sum_{j=1}^{n} \sum_{s=1}^{n} \lambda_{js} \ln p_j \ln p_s + \sum_{i=1}^{m} \sum_{j=1}^{n} \theta_{ij} \ln q_i \ln p_j \qquad (1)$$

where $q_i$ is the quantity of the ith output, $p_j$ is the price of the jth input, and ln denotes natural logarithm. It is possible to derive a system of cost-share equations directly from the translog cost function by differentiating (1) with respect to $p_j$,

$$M_j = \frac{p_j x_j}{C} = \frac{\partial \ln C}{\partial \ln p_j}$$

$$\text{or } M_j = \beta_j + \sum_{s=1}^{n} \lambda_{js} \ln p_s + \sum_{i=1}^{m} \theta_{ij} \ln q_i \qquad (2)$$

where $M_j$ is the cost share of the jth input.

From this cost function, economically interesting properties can be derived. Some of these properties are briefly described below. To fully understand the nature of size-related economies in banking, changes in costs due to proportionate and disproportionate increases in output quantities, and changes in cost due to simultaneous production of several different outputs in a single bank must be considered. While economies of scale addresses the former issue, economies of scope addresses the latter.

There are two measures of multiproduct economies of scale at the bank branch level: overall and product-specific. The overall measure of scale economies is of the form,

$$S = \sum_{i=1}^{m} \frac{\partial \ln C}{\partial \ln q_i}$$

$$\text{or } S = \sum_{i=1}^{m} \alpha_i + \sum_{i=1}^{m}\sum_{k=1}^{m} \gamma_{ik} \ln q_k + \sum_{i=1}^{m}\sum_{j=1}^{n} \theta_{ij} \ln p_j \qquad (3)$$

Values of S less than one imply increasing returns to scale (Murray and White).

Another type of scale economy stems from variation in the output of one product, holding constant the quantities of other products. Product-specific economies of scale $S_i$, are defined as the marginal cost of producing a particular product divided by the average incremental cost of its production (Mester),

$$S_i = \frac{\partial C / \partial q_i}{(C(Q) - C(Q_{-i}))/q_i} \qquad (4)$$

where, $Q_{-i}$ is the output vector with a zero replacing the quantity of the ith output. If $S_i$ is less than one, then product-specific scale economies exist.

There are several important properties that relate to the mix of output among different products. For the purposes of this paper, economies of scope are emphasized. Economies of scope are said to exist if joint production of m products by one firm is less costly than the combined costs of production of m specialty firms. This implies cost savings from joint production. Economies of scope and cost complementarities in production arise from inputs that are shared jointly without complete congestion. Economies of scope exist between $q_i$ and $q_k$ if,

$$C(q_i, q_k) < C(q_i, 0) + C(0, q_k)$$

The Willig index of scope economies (Panzar and Willig) measures the percentage reduction in costs due to joint production, and is of the form,

$$SC = \left(C(q_i, 0) + C(0, q_k) - C(q_i, q_k)\right) / C(q_i, q_k) \qquad (5)$$

Since the translog cost function is undefined at zero output levels, SC and $S_i$ were approximated by substituting 10 percent of the sample mean where $q_i = 0$, and using mean values for all other variables in computing the cost function (1). Economies of scope are increasing, constant or decreasing as SC is greater than, equal to, or less than zero.

At the micro level several policies are designed to achieve scale economies in Bangladesh. The two-for-one licensing policy resulted in the proliferation of numerous small bank branches in the rural areas. Banks may have opened new branches before exhausting economies of scale at existing branches for reasons discussed earlier, i.e., limited market size, location in remote areas, or regulatory restrictions. A wider network of branches has improved access and convenience to bank customers. Convenience and economies of scale interact in a way that makes efficiency consistent with a range of branch sizes and considerable variety in the extent of branching. Since

BKB does not have as strong a tradition of deposit mobilization as the other banks it was expected that BKB would exhibit economies of scale in deposit mobilization, while the NCBs would be characterized by economies in lending.

There is evidence of excess capacity among bank branches in the rural areas of Bangladesh (World Bank). If these branches are considering producing new financial services, this possibility may be enhanced by the existence of scope economies in the overall cost function. This is because the incremental cost of producing the second set of financial services will be less than that for a specialty firm. Further, knowledge of cost complementarities may give insights as to how the bank can appropriately change its output mix in response to a change in demand for its products. Scope economies are expected to be more pronounced in BKB due to greater emphasis placed on lending.

Definition of Variables

The definitions used to measure bank output and costs have changed considerably as the literature on bank costs has developed over the past twenty years. The estimation of the cost function is particularly sensitive to the definition of output of banking institutions (Gilbert). Outputs which have been used in various studies include: value of total assets, earning assets, total deposits, demand deposits; number of deposit and loan accounts; gross operating income; and/or a combination of these.

Another important specification issue is the definition of the dependent variable, cost. Should the cost variable associated with the output metric chosen include only operating costs (Cuevas; Gilligan, Smirlock and Marshall), or should it include both operating and interest costs (Berger, Hanweck and Humphrey; Lawrence and Shay)? These choices yield several specification combinations. Most authors reduce this set of alternatives down to one or two from which to generalize the banking industry.

This study evaluated the robustness of cost properties (scale and scope economies) across alternative specifications of bank costs and output metrics. The measures are estimated using two ways of measuring bank outputs and costs i.e., production vs. intermediation approach. The number of output-cost configurations is reducing by tying the choice of which bank costs to include to the metric chosen for bank output. Under the production approach, banks incur labor and capital costs by producing loan and deposit accounts of various sizes. Operating (nonfinancial) costs are specified in the cost function, and number of accounts are used as the output metric, while average account sizes are specified to control for other account characteristics (Kolari and Zardkoohi). Under the intermediation approach, banks intermediate deposits and other borrowings into loans and other assets. Total operating plus interest costs are specified and value of loans and deposits measured in takas are the output metric (Sealey and Lindley).[2]

The remaining two combinations of output and cost are less appealing. First, output may be measured in takas while only operating costs are used in C. The drawback of this approach is that a branch can appear to have achieved impressive scale economies merely by using borrowed funds to fund a larger asset portfolio. Moreover

---

[2] Taka is the unit of Bangladeshi currency, where TK 25 = $1 during the period under study.

if these borrowed funds are another branch's deposits, the exclusion of interest costs hides operating costs incurred at another branch. Second, output could be measured as numbers of accounts and costs could include both interest and operating expenses. A problem with this approach is that the loan outputs into which the takas obtained in exchange for interest are transformed should also be measured in terms of takas, not number of accounts.[3]

Under both approaches, the value-added criterion is used to determine which of the bank liability and asset categories should be treated as bank outputs. For instance, funds borrowed from the head office entail almost no operating expenses or value added, and so are treated as intermediate inputs with interest costs only. Deposits, on the other hand, are treated as outputs since considerable value added is entailed in the form of safekeeping, liquidity, and payments services to depositors. The maintained assumption is that borrowed funds entail no scale or scope economies. The issue of deposit-mobilization versus borrowing is especially relevant in Bangladesh because of the importance of loan targeting and credit allocation programs in agriculture.

The appropriate choice between the two approaches depends on the question being asked. The production approach appears to be useful for answering questions about the operational efficiency of banks. However, for questions related to the economic viability of banks, the intermediation approach is preferred because it is more inclusive of the total costs of banking. The empirical results from applying the production approach may be termed "operating cost" scale and scope economies, and those from the intermediation approach may be called "total cost" scale and scope economies.

Factor price definitions were common to both approaches. Two factors were considered, labor and capital. The price of labor services was measured as the annual average salary plus fringe benefits paid to bank employees divided by the total number of employees. The price of capital was measured by the sum of rents paid and depreciation divided by the value of loan and deposit balances.

Data

The focus of this study is a sample of 190 rural branches of the four nationalized commercial banks (NCBs) and the agricultural development bank, BKB. The data, consisting of income-expense statements on a semi-annual basis, were obtained for a period of two years – 1983 and 1984 – from the Bangladesh Bank. In addition, quarterly data were obtained on loans and deposits for the same set of branches over the same time period. These five institutions were selected for study because they participated in the USAID Rural Finance Project, and because they dominate the rural areas in terms of branches, lending, and deposit mobilization operations. The breakdown of the 190 branches by bank is as follows: Agrani – 40; Janata – 44; Rupali – 19; Sonali – 46; and BKB – 41. Proportionate sampling was used in the selection process. The population consisted of all rural branches of the five institutions. All variables were expressed in real terms using the World Bank rural consumer price index.

---

[3] The four possible combinations of output and costs produced average cost curves of roughly comparable shape when plotted using raw data.

Table 2 gives the mean values of the variables in the sample. Operating costs account for approximately half of total costs in Agrani, Janata, and Rupali. In contrast, interest expense constitutes a significant portion of total costs in Sonali and BKB. Nearly three-fourths of the total cost of BKB branches consists of interest payments on funds borrowed from the head office. Labor represents a far greater share of total costs than capital in all banks. The average size of a branch (measured by adding deposits and loans) is largest for Sonali and BKB compared to the other three banks, but the combination of assets and liabilities is quite different among the banks. Loans exceed deposits by a wide margin in BKB, they are roughly equal in Sonali, but deposits exceed loans in the remaining NCBs.[4] Average deposit size is particularly small for BKB compared to the other banks, while average loan size is fairly similar for all the banks except Agrani. Under the maintained assumption that borrowed funds entail no scale or scope economies, the production approach would overestimate the economies of scale. The bias is expected to be more pronounced for BKB because of its heavy reliance on borrowed funds.[5]

In the empirical section that follows, the same functional form is applied to the same data sets for the five banks for both the production and intermediation approaches to establish what, if any, are the qualitative differences between the results of the two approaches. Maximum-likelihood estimates were obtained by estimating the cost equation (1) and the labor share equation (2) using the iterative seemingly unrelated equations (SURE) technique. The share equation corresponding to capital was omitted. Restrictions implying homogeneity of degree one in input prices and symmetry were imposed.

The banks were studied separately for two reasons. First, there is a priori evidence to suggest that there are managerial and operational differences among the banks. Second, statistical testing using dummy variables suggested that the differences among the banks were significant and warranted separate analysis.

## RESULTS

Due to space considerations, the estimated parameters and t-ratios for the ten estimated equations (two for each bank) are not reported here.[6] The R-square were reasonably high and most of the parameters were of the expected sign and were statistically significant. In general, the intermediation approach appeared to provide a better fit than the production approach, both in terms of R-square and the significance of individual coefficients. Using the estimated coefficients of the cost function, it is possible to investigate the production structure of the Bangladeshi banking system.

---

[4] Outstanding loans rather than disbursements are used in the value definition of loans. Loan recovery has been so slow that data on outstanding rural advances may greatly overstate actual loan disbursement.

[5] Caution is required in drawing many inferences from these data. These are mean values for a cross-section of branches, and the distribution around the means were different among the banks. In particular, although on average Agrani, Janata, and Rupali branches appear to be net deposit mobilizers, there was considerable variation among branches in the loan/deposit ratio. In fact, since 1983 the overall rural deposit/rural loan ratio has been substantially less than one.

[6] For a full discussion of the results see Srinivasan.

Tables 3 show the overall scale economy measures and elasticity of output with respect to loans and deposits for the five banks under the production and intermediation approaches. In each case, scale economies are calculated at the geometric means of two deposit-size classes and the overall geometric mean to show how the economies or diseconomies vary with branch size. Use of the production approach suggests that the "average" Agrani and Rupali branches are in the constant returns to scale range, while operating cost scale economies appear to prevail in Janata, Sonali and BKB. A 10 percent increase in the production of both outputs will generate increases in costs ranging from 6.8 percent (BKB) to 9.4 percent (Rupali). Under the intermediation approach, however, there are diseconomies of scale at all banks. Further, total cost diseconomies are most pronounced at BKB, which interestingly enough, also exhibited the highest cost advantage under the production approach. A comparable increase in output of 10 percent under the intermediation approach leads to a 16.6 percent increase in costs for BKB.

There are two plausible explanations for this contrast. First, as hypothesized, the production approach involves an innate bias towards economies of scale. Measured economies under the production approach are biased by a branch's choice of producing deposits or borrowing funds from the head office (in other words expanding the loan portfolio without expanding the deposit portfolio). The production approach may find more scale economies than appropriate as branches with larger loan portfolios employ a higher proportion of borrowed funds. This bias is more pronounced for BKB and is reflected in the estimates for overall scale economies under the two approaches. Interest expense on borrowed funds constitutes 41 percent of total costs in BKB compared with less than 25 percent in the three other banks for which data are available (Table 2). Intermediation approach scale economies are thus moderated by borrowings from the head office which have no scale economies by assumption. The other reason that scale economies may be more quickly exhausted in the intermediation approach is that smaller accounts cost more per taka and average account sizes decrease with numbers of accounts at the margin for both loans and deposits.

As for variation in overall scale economies across size classes, [7] Sonali and BKB branches are too small to exhaust scale economies under the production approach, while Rupali branches of all sizes show constant returns to scale. Only Agrani and Janata branches exhibited U-shaped cost curves, with the curve flattening out in the TK 1 – 1.5 million range. The results of the production approach taken in totality suggest that the smallest branches of all banks (except Rupali) may not be large enough to achieve full operating cost efficiency. However, this need not imply that small branches are not economically viable, since the production approach neglects interest expenses.

Overall scale economy results for the small and large branch cases under the intermediation approach are also reported in table 3. Contrary to the production approach, branches in even the smallest size classes appear to be efficient. As discussed above, there are two main reasons for this result. First, average account size tends to decrease with the number of accounts for both outputs and across size classes. As a result, scale economies are exhausted more quickly in the intermediation than in

[7] The scale economies were evaluated at the means of eight deposit size classes of which only two are reported here as the small and large branch cases.

the production approach, which holds average account size constant by assumption. The second reason is that all scale economies or diseconomies in operating plus regular interest costs are diluted by the inclusion of borrowed funds.

The estimates obtained for output elasticities of cost with respect to loans and deposits (table 3) and product-specific scale economies (not reported here), indicate that economies of scale are relatively more pronounced in lending in the case of Agrani, Janata, Rupali banks. As expected, BKB and also Sonali showed increasing returns to deposit mobilization under both the production and intermediation approaches.

The cost results in table 4 apply to an average bank branch which produces the geometric mean output vector and pays the geometric mean prices for factors of production. The shares of lending and deposit mobilization in total costs (Table 4, rows 1 and 2) are somewhat similar for Agrani, Janata, and Rupali banks across the two models. Sonali and BKB, however, with their relatively higher dependence on borrowed funds, show significantly higher shares for lending costs under the intermediation approach. The patterns observed here are consistent with Sonali and BKB's heavy reliance on refinance funds and greater participation in the loan targeting programs of the government. Lower interest rates on rediscount funds relative to deposits act as a disincentive for mobilizing deposits.

As expected, overall intermediation costs are higher under the intermediation approach in all cases, ranging from 7 percent to over 16 percent (rows 3-8). These numbers are estimates of the minimum interest rate that should be charged for the banks to break-even.[8] Only Sonali and BKB can break-even at the interest rate of 12 percent permitted on agricultural loans during the early 1980s. Note that the marginal costs of lending are higher than the marginal costs of deposit mobilization under both approaches. The marginal cost per loan account and per deposit account are increasing functions of loan-size and deposit-size, respectively. This finding is consistent with the data in table 2 that show average loan size is greater than the average size of a deposit account.

There are interesting patterns in average costs across banks (table 4). The overall average and marginal costs of intermediation are lower for Sonali and BKB relative to the other banks. The higher overall average costs of Agrani, Janata, and Rupali banks appear to be the result of higher deposit mobilization costs. Sonali has preferred access to some low cost deposits because of its treasury role, while BKB branches rely heavily on head office borrowing to fund their loan portfolios. It is generally believed that Sonali and BKB make a higher proportion of targeted loans than do other banks. In order to accelerate the loan disbursal process for special agricultural credit programs, commissions were set up to approve loans in the early 1980s. These commissions effectively removed bankers from the borrower selection process (Smith). Given the minimal involvement of branch personnel in disbursing and recovering these targeted loans, the low lending costs in Sonali and BKB are not surprising. In fact, it can be concluded that these costs are "too low". A note of caution is that risk costs are not considered so the above analysis does not imply that targeted agricultural loans are "less costly" than other types of loans.

---

[8] These estimates exclude provisions for bad debt, and implicitly assume that all loans made are recovered.

If scope economies are positive, it is more cost efficient to produce deposits and loans together rather than to split into two firms, one producing deposits alone and the other producing loans. Agrani and Sonali banks display diseconomies of scope under both approaches, i.e., they would benefit by splitting their loan activities from their deposit activities (table 4, row 9). The estimate for Agrani bank can be interpreted as follows: the bank's costs are 43 percent higher under the production approach if it increases output using an optimal mix of any particular combination of outputs, as compared to increasing the bank's total output (deposits plus loans) by increasing each of the bank's products one at a time (from 10 percent of the overall sample mean). BKB is the only bank to show significant scope economies under both approaches with cost savings of over 20 percent, while Janata and Rupali exhibit economies of scope under the production approach and diseconomies under the intermediation approach.

The prevalence of scope diseconomies in Agrani and Sonali is unexpected because of regulatory constraints which force the banks to emphasize agricultural lending at the expense of other potentially profitable types of lending activity. Since economies of scope potentially arise from the sharing of a joint input such as credit information collection, it is likely that minimum loan screening by bank branches in Bangladesh may result in absence of scope economies (Smith). The finding of scope diseconomies does not imply that there are no economic reasons for joint production. The results are consistent with product mix and output costs being influenced by nonmeasured customer convenience and joint demand for bank outputs and portfolio risk considerations, rather than being driven solely by bank cost considerations.

To summarize, this section presented findings on cost characteristics of the five banks using two approaches to measure banks costs and output: the production and intermediation approaches. Some of the measures were significantly different between the two models, suggesting that use of the production approach alone may lead to biased and misleading policy conclusions. However, the estimates did not reflect risk costs. The impact of loan default on bank viability is evaluated in the next section.

## LOAN DELINQUENCY, BANK COSTS AND BANK VIABILITY

Some research has been conducted on loan delinquency in Bangladesh (Cookson; Gregory and Adams; and O'Donnell) and a consensus emerged that the repayment situation of loans made by rural branches was bad, and getting worse. Because of the seriousness of this problem in Bangladesh, the impact of the loan recovery problem on the results of this study must be evaluated. Unfortunately, data on loan recovery were not available in a form that could be directly incorporated into the analysis. Therefore, analysis of loan recovery relied on results from studies that were conducted using a subset of the bank cost data and bank-level analysis.

Two points should be noted at the outset (Meyer and Srinivasan). First, the resource costs (labor, capital, materials) incurred by bank branches in all aspects of loan monitoring, loan collection, legal processes to recover bad debts, etc. were included in the costs estimated above to the extent that they were adequately captured in the branch income-expense reports. Therefore, the cost of routine loan recovery efforts is included in the cost function estimates. Second, income from advances is reported on an accrued rather than a realized basis and there is no systematic policy for writing-off bad debts of bank branches in Bangladesh.

The impact of loan delinquency on bank viability was evaluated by examining the percentage of the loan portfolio in arrears, constructing a loan recovery profile, and estimating the risk premium that must be charged for the branches to cover costs and break-even. The official recovery information for agricultural loans is reported in table 5. It should be noted that this measurement has its limitations: it combines flow figures, current recoveries and dues, with a stock figure, past overdues. Table 5 shows the arrears problem to be very severe with 75 percent of the loans due in 1985/86 in arrears. On a national scale the trend of overdues in agricultural loans improved until 1981/1982 and has since been deteriorating. Gregory and Adams analyzed loan recovery for a sample of short-term agricultural loans made in 1979 to 1984 and found that in total only 45 percent of the original principal had been recovered, as of March 1986. The recovery performance of individual banks in the sample followed a downward trend, mirroring the official recovery position.

To clarify trends in loan recovery, Meyer suggests an alternative approach to examining loan recovery - the concept of the loan recovery profile, and whether or not that profile had actually shifted downward in recent years. The loan recovery loan profile plots the relationship between time and the percentage of the loan principal repaid. A comparison of the loan recovery profile for loans made in various years will show if a lender is more or less successful in collecting loans made in one year versus another. This comparison will also suggest whether or not there is a change in borrower behavior regarding loan repayment.

Figure 1 shows the loan recovery profile for 5,270 short-term agricultural loans made in 1979 - 1984. The best total recovery is for loans made in 1979. After more than five years past the due date, the cumulative proportion of principal repaid reached about 65 percent. The recovery profile for loans made in 1980, 1981, and 1982 is fairly similar in terms of speed of loan recovery. A sharp change in loan recovery profile appears to have occurred with loans made in 1983 and 1984. Three years after due date, only 42 percent of the principal was recovered for loans made in 1983. Likewise, the loan recovery profile two years after due date is much worse for loans made in 1984 compared to loans made in other years. If these trends continue, the percent of principal eventually recovered after five years for 1983 and 1984 loans may be far less than 60 percent. These data show that loan recovery for short-term loans has clearly deteriorated over time for these sample bank branches. The disruption of financial discipline that followed the interest forgiveness programs of 1984 and 1985 may have contributed to reducing loan recovery performance for all loans made before and after that date (Rashid).

Since many loans made by rural branches are not repaid, the transaction costs estimates reported represent the lower bound for the minimum interest spread required to cover costs. A more realistic estimate of the minimum interest spread required for unsubsidized operations implies the need for appropriate provisions for bad debts. A casual review of bank financial statements suggests that reserves for bad debts must be too low unless very optimistic estimates are made about improvements in loan recovery.

Lee and Baker used a simple, but effective formula to accentuate the debilitating effects of defaults on a loan portfolio. They consider lending costs ($\iota$) to be given by:

$$\iota = f + k + r$$

where f, k, and r represent cost of funds, administrative costs and risk premium, respectively. The risk premium is an ex ante risk cost or the premium required to induce the lender to lend in the face of risk. Default causes the lender to lose not only the uncollected principal and interest, but also the associated cost of funds, f, and administrative costs, k, incurred in servicing the loans that were never recovered. Thus the risk premium can be represented as:

$$r = \frac{d}{1-d}(1 + f + k)$$

where the default rate, d, is expressed in terms of the loan principal. Using a hypothetical f and k of 7 percent and 2 percent respectively, with a default rate of 0.5 percent, they show lending costs to be

$$\iota = 0.07 + 0.02 + 0.005 \,/\, 1\text{-}0.005\ (1 + 0.07 + 0.02) = 0.0955$$

The risk premium (0.55 percent) is greater than the default rate that generated it (0.5 percent). With f and k at 7 percent and 2 percent respectively, $\iota$ becomes 100 percent of the principal loaned when d reaches 45.5 percent. This threshold value is lower if f and k are higher.

Administrative costs and cost of funds were substituted in the above formula to estimate the threshold default rate. Lending costs were obtained from Table 4 under the intermediation approach. Using the Lee-Baker formula the threshold or break-even value for the default rate ranges from 44.9 percent for Janata Bank to 47.9 percent for BKB. That is, at a cost of funds plus administrative cost of 10.23 percent, total lending costs will be 100 percent of loans outstanding when the default rate reaches 44.9 percent of loans outstanding in Janata Bank. An alternative interpretation is that at a 44.9 percent rate of default, the risk premium will be 89.8 percent of loans outstanding, i.e., the institution would have to charge a risk premium of 89.8 (double the default rate) to break-even.

In conclusion, Lee and Baker point out that "this relationship makes default a destructive factor for the lender if it reaches any appreciable level". The structure and level of arrears experienced by all five banks in Bangladesh is clearly one that endangers their loan portfolios and results in the high levels of risk costs presented above. The intermediation approach suggested that spreads ranged from -4.8 percent to 4.8 percent. However, including the risk premium implies that the spreads would turn substantially negative in all banks.

The implication of the poor loan recovery situation in Bangladesh is clear. The future viability of the bank branches surveyed will depend much more on loan recovery performance than on any fine-tuning of banking operations which reduces costs. It is impossible to raise interest margins enough to cover risk premiums of 85 to 90 percent. The costs of loan default swamp all other costs. The only way rural bank branches can remain operational is through huge subsidies provided to them either from the head offices of the banks or the government. At a minimum, these subsidies will equal 40 percent of the value of short-term loans made. The subsidies, in effect, will flow through the banking system to those borrowers who convert their loans into grants by defaulting.

## CONCLUSIONS AND POLICY IMPLICATIONS

The primary objective of this study was to measure and analyze the costs in financial intermediation. Several cost characteristics such as overall and product-specific scale economies, and scope economies were presented for a sample of rural branches of five Bangladeshi banks, using branch-level cost data for 1983 and 1984. All these measures were evaluated using two different approaches – production and intermediation – to measuring bank costs and output.

Some general conclusions emerge from this analysis. First, scale economies were found to be substantially different under the two approaches. From the operating efficiency point of view, the branches showed constant or increasing returns. However, branch expansion to achieve these scale economies could lead to an increase in intrabank flow of funds. On adjusting for interest costs, the same set of branches showed decreasing returns to scale, suggesting that expansion may not be economically viable. Second, elasticities of cost with respect to output and product-specific economies of scale suggest that expansion in the scale of branch operations should be unbalanced. The results suggest that BKB and Sonali should expand deposits relatively more than loans, while the other three banks should expand loans relatively more than deposits. Third, BKB was the only bank to show significant scope economies with cost savings from joint production of loans and deposits of over 20 percent. Finally, ignoring allowances for loan losses, only Sonali and BKB can break even at the interest rate of 12 percent that prevailed during the sample period. These results suggest that the profitability of rural branches is much less than the 5 to 6 percent margin between weighted average deposit and lending rates reported for scheduled banks in 1983 and 1984.[9]

These results suggest several implications for policy makers in Bangladesh and raise important issues that demand attention and future research:

1. Loan recovery is the paramount rural finance challenge today. Failure to effectively improve loan recovery will require enormous bank subsidies that will probably sabotage the future expansion of efficient rural banking and lending.

2. The banking policies pursued by the government have resulted in an expansion of branches, deposits mobilized and rural lending. Much remains to be done, however, to assure the profitability of these branches. The small scale of operations of many branches contributes to the relatively high costs of intermediation. The scale of operations may be small due to low volume of banking business or licensing policies of the Bangladesh Bank. Costs are probably high during the start-up phase of a new branch and decline as deposit and loan volumes increase.

3. Economies of scale appear to suggest further expansion of bank branches. As discussed earlier, this analysis cannot predict whether or not expansion can easily occur with the current number and geographic distribution of bank branches in rural areas. While the number of rural branches increased rapidly,

---

[9] As reported in Economic Trends, August 1985.

geographic coverage of the rural areas is still uneven. Rural branches are located in about half of the roughly 4,000 unions in the country, leaving a large part of the country still unbanked.

4. Given the high default rates, the banks may be justified in not adjusting to the partial scale economies that appear to exist for lending. On the other hand, if banks are to expand their lending operations, adequately supervise the loans, and conduct effective loan recovery, an increase in administrative costs appears inevitable.

5. The current technology for managing deposits and loans must be analyzed. For branches that are located at scales less than optimum for reasons discussed above, cost-reducing technologies should be developed to lower branch transaction costs over time. Special attention must be given to the information demands placed on banks, the costs these demands imply, and the value of such information if it makes little contribution to more efficient banking.

6. Interest margins must be adjusted so that the transaction costs of rural branches are covered by income. Interest rate levels should be determined by building from the bottom up, i.e. establish deposit rates which provide incentives to depositors, then add an interest margin sufficient to cover bank costs and risk premium.

7. Expanding financial services in rural Bangladesh requires a balancing of bank and customer incurred transaction costs. The importance of number of bank branches for deposit mobilization by reducing transaction costs for depositors is discussed in Meyer, Khalily and Hushak. Low borrower and depositor transaction costs imply a large number of widely distributed branches. Additional analysis is needed to determine if the current number and geographic distribution of branches is appropriate to simultaneously meet the objective of reduced customer transaction costs and increased bank efficiency. There may be important trade-offs so that rural customers will gladly pay higher costs for bank services because the branch is small, but is located nearby.

8. Finally, the cost structures obtained under the production and intermediation approach have important policy implications. The intermediation approach focused on the weakness of the rural banking system to sustain itself. Rural branches have become little more than retail lending operations, relying on rediscount funds. The production approach suggests that expansion is economically viable only if rural branches function as true financial intermediaries, providing both lending and deposit mobilization services.

Table 1

Agricultural Credit : Sources of Funds, 1975 - 1987.

| Year[a/] | Total Disbursement (D) | Total Recovery[b/] (R) | Net Refinance[c/] (NR) | R/D | NR/D | Other Sources[d/] |
|---|---|---|---|---|---|---|
| | (Millions of Takas) | | | (Percent) | | |
| 1975 | 377 | 367 | –47 | 97 | –13 | 15 |
| 1976 | 461 | 496 | –48 | 108 | –11 | 3 |
| 1977 | 864 | 571 | 132 | 66 | 15 | 19 |
| 1978 | 1,569 | 936 | 322 | 60 | 21 | 20 |
| 1979 | 1,632 | 1,160 | 361 | 71 | 22 | 7 |
| 1980 | 2,821 | 1,475 | 1,032 | 52 | 37 | 11 |
| 1981 | 3,734 | 2,214 | 699 | 59 | 19 | 22 |
| 1982 | 4,238 | 3,143 | 667 | 74 | 16 | 10 |
| 1983 | 6,786 | 3,423 | 2,866 | 51 | 42 | 7 |
| 1984 | 10,053 | 5,176 | 2,574 | 52 | 26 | 23 |
| 1985 | 11,498 | 5,839 | 4,739 | 51 | 41 | 8 |
| 1986 | 6,317 | 6,072 | –317 | 96 | –5 | 9 |
| 1987 | 6,512 | 11,068 | –1,691 | 170 | –26 | –44 |

a/ As of June 30 of the year.
b/ Includes principal and interest.
c/ Net Refinance from Bangladesh Bank.
d/ Note that this column is a residual value.

Source: Ahmed, Zia, Rural Banking in Bangladesh: A Brief Review, 1987.

Table 2

Mean Values for the Cost Function Variables [a]

| VARIABLE | BANK | | | | |
|---|---|---|---|---|---|
| | AGRANI | JANATA | RUPALI | SONALI | BKB |
| Total Cost[b] (TK) | 1,055,278 | 757,888 | 849,640 | 802,026 | 1,149,764 |
| Operating Cost (TK) | 550,860 | 328,958 | 461,806 | 261,244 | 239,982 |
| Interest Expense (Deposits) (TK) | 270,642 | 319,726 | 387,834 | 540,782[c] | 89,692 |
| Interest Expense (Borrowed Funds)[d] (TK) | 233,776 | 109,204 | 39,188 | – | 820,090 |
| Price of Labor (TK/employee) | 19,840 | 12,186 | 15,892 | 12,118 | 16,226 |
| Price of Capital (TK)[e] | 0.0024 | 0.0036 | 0.0016 | 0.0038 | 0.0012 |
| Labor Share | 0.72 | 0.73 | 0.80 | 0.77 | 0.81 |
| Capital Share | 0.06 | 0.14 | 0.08 | 0.10 | 0.07 |
| Deposits (TK) | 4,565,000 | 5,308,674 | 6,003,013 | 6,455,717 | 1,417,470 |
| Loans Outstanding (TK) | 3,924,740 | 3,557,767 | 3,030,026 | 6,054,897 | 12,390,417 |
| Average Deposit Size (TK) | 2,080 | 2,450 | 2,893 | 2,988 | 1,000 |
| Average Loan Size (TK) | 4,490 | 3,496 | 3,773 | 3,280 | 3,832 |
| Number of Branches | 40 | 43 | 19 | 46 | 42 |

[a] Average for the pooled sample, 1983 and 1984.

[b] Total Cost = Operating Cost + Interest Expense (Deposits) + Interest Expense (Borrowed Funds).

[c] Total Interest Expense.

[d] Borrowed Funds include transfer of deposits from surplus to deficit branches as well as refinance funds.

[e] Capital costs per taka of total deposits and loans.

Table 3

Economies of Scale and Elasticity of Cost With Respect to Output

| COST CONCEPT | BANK | | | | |
|---|---|---|---|---|---|
| | AGRANI | JANATA | RUPALI | SONALI | BKB |
| **(A) PRODUCTION APPROACH** | | | | | |
| 1. Small Branch[a/] | | | | | |
| Economies of Scale | 0.91 | 0.75* | 0.88 | 0.76* | 0.66* |
| Elasticity of Cost wrt Output | | | | | |
| Deposits | 0.44* | 0.38* | 0.57* | 0.31* | 0.14* |
| Loans | 0.47* | 0.36* | 0.31* | 0.45* | 0.52* |
| 2. Overall Mean[b/] | | | | | |
| Economies of Scale | 0.90 | 0.82* | 0.94 | 0.77* | 0.68* |
| Elasticity of Cost wrt Output | | | | | |
| Deposits | 0.49* | 0.46* | 0.64* | 0.36* | 0.15* |
| Loans | 0.41* | 0.36* | 0.30* | 0.41* | 0.53* |
| 3. Large Branch[c/] | | | | | |
| Economies of Scale | 1.14 | 0.84** | 1.02 | 0.83* | 0.73* |
| Elasticity of Cost wrt Output | | | | | |
| Deposits | 0.56* | 0.53* | 0.72† | 0.39* | 0.19* |
| Loans | 0.58* | 0.32* | 0.30* | 0.44* | 0.54* |
| **(B) INTERMEDIATION APPROACH** | | | | | |
| 1. Small Branch | | | | | |
| Economies of Scale | 1.07 | 0.83* | 0.97 | 0.88* | 1.68* |
| Elasticity of Cost wrt Output | | | | | |
| Deposits | 0.49* | 0.39* | 0.54* | 0.16* | 0.11* |
| Loans | 0.58* | 0.44* | 0.43* | 0.71* | 1.57* |
| 2. Overall Mean | | | | | |
| Economies of Scale | 1.26* | 1.15* | 1.16** | 1.20* | 1.66* |
| Elasticity of Cost wrt Output | | | | | |
| Deposits | 0.68* | 0.59* | 0.73* | 0.44* | 0.11* |
| Loans | 0.58* | 0.56* | 0.44* | 0.76* | 1.55* |
| 3. Large Branch | | | | | |
| Economies of Scale | 1.70* | 1.38* | 1.30* | 1.49* | 1.56* |
| Elasticity of Cost wrt Output | | | | | |
| Deposits | 0.87** | 0.74* | 0.83 | 0.56* | 0.08* |
| Loans | 0.83* | 0.64* | 0.47* | 0.93 | 1.48* |

* Indicates significantly different from one at the 1 percent level.
** Indicates significantly different from one at the 5 percent level.
† Indicates significantly different from one at the 10 percent level.
a/ Evaluated at deposit size class of Tk 200,000 – 400,000.
b/ Evaluated at the geometric means of the variables in the models.
c/ Evaluated at deposit size class of Tk 2,000,000 – 3,000,000.

Table 4

Cost of Lending, Deposit Mobilization, Overall Intermediation Costs and Scope Economies

| COST CONCEPT[a/] | BANK | | | | |
|---|---|---|---|---|---|
| | AGRANI | JANATA | RUPALI | SONALI | BKB |
| **(A) PRODUCTION APPROACH** | | | | | |
| 1. Share of Deposits in total costs | 54.74% | 56.04% | 68.14% | 47.14% | 21.37% |
| 2. Share of Loans in total costs | 45.26% | 43.96% | 31.86% | 52.86% | 78.63% |
| Costs of Mobilizing Deposits | | | | | |
| 3. Average Costs | 1.59% | 1.44% | 1.90% | 1.09% | 0.63% |
| 4. Marginal Costs | 0.78% | 0.67% | 1.21% | 0.40% | 0.09% |
| Costs of Lending | | | | | |
| 5. Average Costs | 6.49% | 5.49% | 6.53% | 2.34% | 1.06% |
| 6. Marginal Costs | 2.65% | 1.99% | 1.95% | 0.95% | 0.55% |
| Overall Intermediation Cost | | | | | |
| 7. Average Costs | 8.08% | 6.93% | 8.43% | 3.43% | 1.69% |
| 8. Marginal Costs | 3.43% | 2.66% | 3.17% | 1.35% | 0.64% |
| 9. Economies of Scope[b/] | –0.43 | 0.39 | 0.01 | –0.15 | 0.21 |
| **(B) INTERMEDIATION APPROACH** | | | | | |
| 1. Share of Deposits in total costs | 54.45% | 50.10% | 62.61% | 36.37% | 6.57% |
| 2. Share of Loans in total costs | 45.55% | 49.90% | 37.39% | 63.63% | 93.43% |
| Costs of Mobilizing Deposits | | | | | |
| 3. Average Costs | 6.67% | 6.53% | 4.73% | 2.68% | 2.87% |
| 4. Marginal Costs | 4.56% | 3.61% | 3.45% | 1.17% | 0.31% |
| Costs of Lending | | | | | |
| 5. Average Costs | 9.13% | 10.23% | 7.80% | 5.67% | 4.30% |
| 6. Marginal Costs | 5.22% | 5.63% | 3.40% | 4.32% | 6.67% |
| Overall Intermediation Cost | | | | | |
| 7. Average Costs | 15.80% | 16.76% | 12.53% | 8.35% | 7.17% |
| 8. Marginal Costs | 9.78% | 9.24% | 6.85% | 5.49% | 6.99% |
| 9. Economies of Scope | –0.84 | –0.33 | –0.75 | –0.51 | 0.24 |

a/ Evaluated at the geometric means of the variables in the models.

b/ Evaluated at 10 percent of the sample mean.

Table 5

Official Agricultural Loan Recovery Position by Bank and by Year*

| Bank | Year | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1978/79 | 1979/80 | 1980/81 | 1981/82 | 1982/83 | 1983/84 | 1984/85 | 1985/86** |
| | (Percent) | | | | | | | |
| Agrani | 41 | 30 | 27 | 28 | 34 | 37 | 37 | 21 |
| Janata | 53 | 32 | 35 | 39 | 43 | 33 | 32 | 22 |
| Rupali | 25 | 23 | 15 | 34 | 10 | 25 | 17 | 13 |
| Sonali | 48 | 36 | 38 | 31 | 37 | 39 | 32 | 20 |
| BKB | 54 | 56 | 68 | 68 | 50 | 50 | 44 | 32 |
| Total | 45 | 42 | 49 | 48 | 42 | 42 | 38 | 25 |

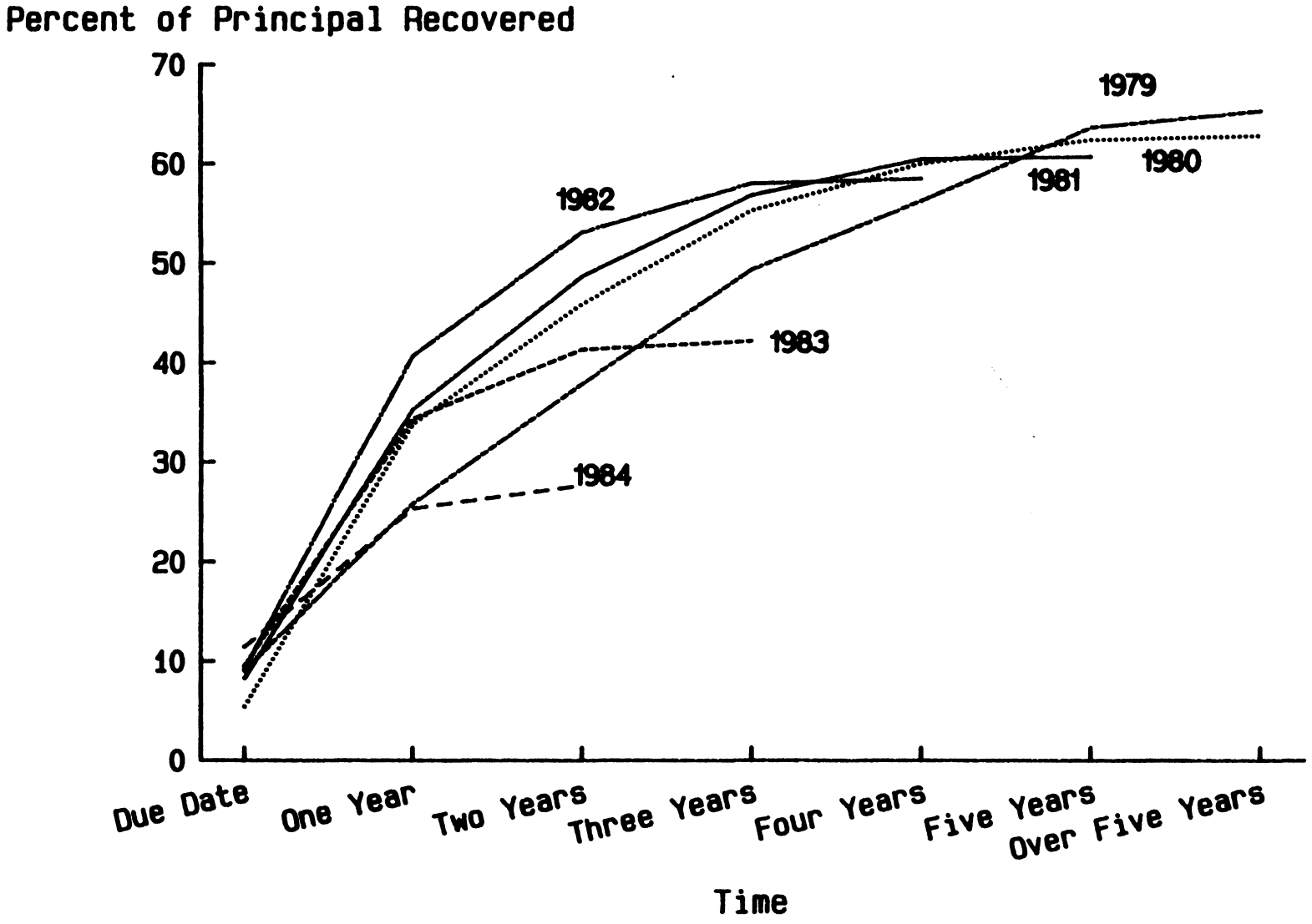
* Recovery is measured as loan payments received (LR) during a given period as a percent of loans due during that period (LD) plus previous overdues (LPD). Symbolically this percentage would be LR/(LD+LPD).

** The 1985/86 figures are only up to April 1986.

Source: Gregory and Adams.

Figure 1

# Loan Recovery Profile for Short-Term Agricultural Loans Made in 1979-1984: All Banks



# REFERENCES


1. Ahmed, Zia U., "Rural Banking in Bangladesh: A Brief Review," Unpublished Paper, 1987.

2. Berger, Allen N., Gerald A. Hanweck, and David B. Humphrey, "Competitive Viability in Banking: Scale, Scope, and Product Mix Economies," Research Paper in Banking and Financial Economics, Board of Governors of the Federal Reserve System, 1986.

3. Cookson, Forest E., "Loan Recovery in the Rural Finance Sector," Rural Finance Report, Robert R. Nathan Associates, Washington, D.C., 1986.

4. Cuevas, Carlos E., "Transaction Costs of Financial Intermediation in Developing Countries," Economics and Sociology Occasional Paper No. 1469, The Ohio State University, 1988.

5. Gilbert, R. Alton, "Bank Market Structure and Competition: A Survey," Journal of Money, Credit, and Banking, 16(1984): 617-644.

6. Gilligan, Thomas W., Michael Smirlock, and William Marshall, "Scale and Scope Economies in the Multiproduct Banking Firm," Journal of Monetary Economics, 13(1984): 393-405.

7. Gregory, Gregory L., and Dale W Adams, "Severity of Rural Loan Recovery Problems in Bangladesh," Economics and Sociology Occasional Paper No. 1319, The Ohio State University, 1986.

8. Kolari, James, and Asghar Zardkoohi, Bank Costs, Structure, and Performance, Lexington, MA : D.C. Heath, 1987.

9. Lawrence, Colin and Robert Shay, "Technology and Financial Intermediation in Multiproduct Banking Firms: An Econometric Study of U.S. Banks, 1979-1982," in Lawrence and Shay, editors, Technological Innovation, Regulation and the Monetary Economy. Mass: Ballenger, 1986.

10. Lee, Warren F., and Chester B. Baker, "Market Risks and Lender Behavior," in Peter Barry, editor, Risk Management in Agriculture, Ames, Iowa: Iowa State University Press, 1984.

11. Mester, Loretta J., "A Multiproduct Cost Study of Savings and Loans," Journal of Finance, 42(1987): 423-445.

12. Meyer, Richard L, "Rural Loan Recovery Concepts and Measures," Paper Prepared for the Seminar on Issues in Rural Loan Recovery in Bangladesh, December 1986.

13. Meyer, Richard L., and Aruna Srinivasan, "Policy Implications of Financial Intermediation Costs in Bangladesh," Economics and Sociology Occasional Paper No. 1389, The Ohio State University, 1987.

14. Meyer, Richard L., M.A. Baqui Khalily, and Leroy J. Hushak, "Bank Branches and Rural Deposits: Evidence from Bangladesh," Economics and Sociology Occasional Paper No. 1462, The Ohio State University, 1988.

15. Murray, John D., and Robert W. White, "Economies of Scale and Economies of Scope in Multiproduct Financial Institutions: A Study of British Columbia Credit Unions," Journal of Finance, 38(1983): 887-902.

16. O'Donnell, Arthur J., "An Action Plan to Improve Loan Repayment in Bangladesh," Report Prepared for the Rural Finance Project, National Council of Savings Institutions, Washington, D.C., 1986.

17. Panzar, John C., and Robert D. Willig, "Economies of Scope," American Economic Review, 71(1981): 268-272.

18. Rashid, Raka, "Rural Credit Forgiveness Programs: 1984 and 1985," USAID/Dhaka, Bangladesh, 1986.

19. Sealey, C.W. Jr., and J.T. Lindley, "Inputs, Outputs, and a Theory of Production and Cost at Depository Institutions," Journal of Finance, 32(1977): 1251-1266.

20. Smith, Timothy, "Rural Lending Efficiency in Bangladesh," Report Submitted to Robert R. Nathan Associates and Bangladesh Bank, National Council of Savings Institutions, Washington, D.C., 1985.

21. Srinivasan, Aruna, "A Multiproduct Cost Study of Rural Bank Branches in Bangladesh," Unpublished Ph.D. Dissertation, The Ohio State University, 1988.

22. Virmani, Arvind, "Evaluation of Financial Policy: Credit Allocation in Bangladesh," World Bank Staff Working Paper, No. 672, 1984.

23. World Bank, Bangladesh Agricultural Credit Review - A Joint Review by Government of Bangladesh and World Bank, (in three volumes), 1983.